

STATE OF CALIFORNIA
Budget Change Proposal - Cover Sheet
DF-46 (REV 02/15)

Fiscal Year 2016-17	Business Unit 2660	Department Transportation	Priority No.
Budget Request Name 2660-400-BCP-BR-2016-MR		Program 1835056 - MAINTENANCE	Subprogram

Budget Request Description

Federal Bridge Load Rating

Budget Request Summary

The California Department of Transportation (Caltrans) requests resources to complete federally mandated load rating of state bridges.

Requires Legislation <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Code Section(s) to be Added/Amended/Repealed	
Does this BCP contain information technology (IT) components? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <i>If yes, departmental Chief Information Officer must sign.</i>	Department CIO	Date
For IT requests, specify the date a Special Project Report (SPR) or Feasibility Study Report (FSR) was approved by the Department of Technology, or previously by the Department of Finance. <input type="checkbox"/> FSR <input type="checkbox"/> SPR Project No. Date:		

If proposal affects another department, does other department concur with proposal? ☐ Yes ☐ No
Attach comments of affected department, signed and dated by the department director or designee.

Prepared By TONY TAVARES	Date 04/15/2016	Reviewed By STEVEN KECK	Date 04/15/2016
Department Director MALCOLM DOUGHERTY	Date 04/15/2016	Agency Secretary BRIAN P. KELLY	Date 04/15/2016

Department of Finance Use Only

Additional Review: ☐ Capital Outlay ☐ ITCU ☐ FSCU ☐ OSAE ☐ CALSTARS ☐ Dept. of Technology

BCP Type: ☐ Policy ☐ Workload Budget per Government Code 13308.05

PPBA

Date submitted to the Legislature

MAY 13 2016

Analysis of Problem

A. Budget Request Summary

The California Department of Transportation (Caltrans) requests 26 permanent positions and a total of \$4,640,000 (\$3,653,000 in Personal Services \$237,000 in Operating Expenses and a one-time augmentation of \$750,000 for Operating Expenses for software updates) in federal reimbursement authority.

The Department received a total of 26 five year, Limited Term (LT) positions from two separate requests, one year apart. The first 17 LT positions were for state bridges and expire on June 30, 2016. The second 9 LT positions are for local bridges and will expire on June 30, 2017. Bridge Load Rating work is fully reimbursed by the Federal Highways Administration and this request will not impact state funds.

The Department also requests a one-time appropriation of \$750,000 for California's contribution to AASHTOWare software updates to complete federally mandated load rating of state and local bridges.

The staffing request is expected to complete the initial bridge load rating of 11,300 State and Local bridges by FY2021-22 to satisfy the requirements in the Plan of Corrective Action with FHWA. The current workload covers the work to rate the state's bridges built prior to 1978 – approximately half the state's inventory. All bridges in California (and nationwide) need load rating. There are approximately 24,000 bridges that need to be load rated, with only 11,300 currently under a Plan of Corrective Action. All bridges built after 1978 will require load rating once the initial stage of this effort is complete.

Load rating of bridges needs to be done on a continuous basis to meet federal regulations. Changes in bridge condition and rating specifications must be reported in order to maintain compliance and assure public safety. There is not a mandatory rating cycle time in the federal code, however, most state agencies match the bridge rating cycle with the inspection cycle typically every 2 to 4 years.

B. Background/History

The National Bridge Inspection Standards were established in 1971 and set new federal inspection requirements, including load ratings for bridges. Following adoption of these standards, every state performed a detailed review of the bridge inventory within its borders to identify those candidate structures requiring a load rating to comply with the federal requirements.

The 2008 National Bridge Inspection Standards (NBIS) Annual Program Review concluded that the standard load ratings are not in compliance with the requirements of the Code of Federal Regulations, Title 23, Part 650. The requirements for safety inspections of bridges has seen many changes over the past several years and techniques have varied from state-to-state. A recent review by the Federal Highway Administration (FHWA) concluded the standard load ratings currently used by California and other States remain out of compliance with the requirements of the Code of Federal Regulations. Specifically, they do not comply with current load rating requirements defined in the American Association of Highway and Transportation Officials Manual for Bridge Evaluation. Subsequent reviews by the Federal Highway Administration Inspector General and the General Accounting Office confirmed the load ratings were out of date, including those in California.

The bridge rating work began in FY 2010-11 to evaluate and rate 6,800 State bridges built prior to 1978. A total of 4,500 local bridges were added to the list of bridges that need to be evaluated and rated in FY 2011-12, increasing the total bridge rating workload to 11,300 bridges. Additionally, the initial workload assumptions have changed due to several factors such as limited historical data on old bridge modifications, challenges with load rating specification changes, and ongoing software upgrades that have significant impact on completing the rating process.

The 11,300 bridges were designated as highest priority in the 2011 Plan of Corrective Action signed by the state and FHWA because bridges designed before 1978 were not designed for the California permit load trucks and are considered more vulnerable to potential overload. However, all of the post 1978 bridges, even if designed for Permit loads, must be load rated for the state to be in compliance with the federal regulations.

Analysis of Problem

Since December 15, 2011, the current American Association of Highway and Transportation Officials Manual for Bridge Evaluation load and resistance specification was chosen as the methodology to load rate all bridges, which results in the need for new software development and training. The original estimate assumed load factor specifications were to be used but that code is no longer supported by the American Association of State Highway and transportation officials. There have been a number of problematic shortfalls resulting from software limitations. An overriding example is out of the 950 additional types of state bridges to be load rated, approximately 610 are currently on hold due to software limitations. The software upgrade is still under development. California is one of the lead states in beta testing each release of the software. AASHTOWare is the best software available for load rating and the only software that can accommodate California's specific requirements. The majority of states in the USA use this software. The software developers and AASHTOWare committee have promised revisions to address the remaining required improvements by the late 2016 release.

Further details not anticipated in the original workload assumptions include:

- American Association of State Highway and Transportation Officials bridge rating software is limited for use because of the types of bridges it can analyze. The majority of California's bridges are Box Girder types which were not included in the original software.
- The current and only nationally recognized bridge rating software used remains a work in progress with on-going software revisions, beta testing, workarounds, and debugging. The software is used by a majority of the states and priorities for revisions and improvements must be shared which creates a long lead time for software upgrades. The software is the most comprehensive bridge rating product available even though all California bridge types are not included.
- The inventory of bridges requires a manual investigation of each record to determine the history of modifications that have been performed to widen, retrofit, and/or strengthen the bridge. The number of bridge models to be developed is currently estimated to be nearly double that of the original estimate due to the numerous and unforeseen bridge modifications.
- The original estimated production rate in FY 2011-12 was for approximately two complete bridge load ratings per engineer, per week. Actual progress has been approximately two bridges per engineer per month for a total of 3873 bridge ratings to date. Caltrans has now determined the bridge analysis component accounts for approximately 76% of the work needed to complete a bridge load rating with 24% used for manual records investigation, bridge model correlations, quality assurance inspections, regular reporting and reviews, and the various software revision analysis/testing.
- Resources required to meet our partnership commitments with the FHWA and other stakeholders. The FHWA is responsible for overseeing the nation's bridge design and maintenance programs to assure uniformity across the states with respect to safety and transportation needs. Our partnership commitments are required by federal law. Participation in national committees responsible for producing bridge design and maintenance guidelines and specifications are examples of our commitments.

Resource History (Dollars in thousands)

Program Budget	PY – 4 (2010-11)	PY – 3 (2011-12)*	PY – 2 (2012-13)*	PY – 1 (2013-14)*	PY (2014-15)	CY (2015-16)
Authorized Expenditures	1,374,317	1,550,027	1,894,399	2,002,037	1,541,242	1,566,986
Actual Expenditures	1,361,973	1,545,570	1,880,129	1,912,012	1,426,265	TBD
Revenues	NA	NA	NA	NA	NA	NA
Authorized Positions	5,821	5,825	5,662	5,681	5,707	5,704
Filled Positions	5,241	5,755	5,592	5,525	5,566	TBD
Vacancies	580	70	70	156	141	TBD

*Authorized as of Jan 10 includes cash adjustments from past year actuals

Analysis of Problem

Workload History

Workload Measure	PY – 4 (2010-11)	PY – 3 (2011-12)	PY – 2 (2012-13)	PY – 1 (2013-14)	PY (2014-15)	CY (2015-16*)
Bridges requiring new load ratings	NA	6,800	9,909	8,781	8,076	7,427
Load rating completed	NA	0	1,391	2,519	3,224	3,873

C. State Level Considerations

In addition to bringing California into compliance with federal mandates (Title 23 – Code of Federal Regulations; Part 650; Subpart C – National Bridge Inspection Standards; 650.313(c)), this effort will contribute to our mission of ensuring a safe and sustainable transportation system and will provide important benefits related to the goals of improved safety, system performance, and stewardship.

D. Justification

The original bridge load rating resources are set to expire and progress has been slow due to a number of challenges. Since 2011 there have been ongoing changes to bridge conditions and rating specifications which must be reported to maintain Federal compliance; a lack of historical data to make accurate workload assumptions; numerous software upgrades some of which are still in process; and changes in the scope of work.

One example of the delay is the load rating reporting requirements have been continuously critiqued by the Federal Highway Administration and subsequently have become more comprehensive and complex than was originally estimated in 2011. The original estimate for creating a summary load rating report was 30 minutes per bridge and the actual average to date has been approximately 6 hours. Due to federal involvement and revisions to the AASHTO Manual for Bridge Evaluation, the amount of time for our quality control and quality assurance programs now require three hours per bridge.

Under the scope of work identified in the 2011 Caltrans Plan of Corrective Action with FHWA, there are still approximately 7,500 bridges to load rate (including both state and local bridges) and it is estimated with the existing team of 26 permanent positions it will take until 2022 to complete this work. The other factors such as software enhancements, design specification changes and field measurements have contributed to the overall delay and adding new hires would also impact production. The most efficient way to complete and continue the bridge load rating work would be to maintain the existing staff permanently.

The requested resources will ensure that the current and future load rating efforts comply with all reporting and rating specifications. The bridge load rating will be maintained using the 2014 California Bridges and Structures Strategic Direction and the requirements of the Federal Highway Administration's (FHWA) National Bridge Inspection Standards (NBIS) and applicable Code of Federal Regulations (CFR).

Bridge load rating is essential in maintaining a safe, efficient, and economically sound transportation system. The effort to develop a team of professionally licensed engineers to load rate a total of 11,300 bridges was difficult to estimate. The original number of bridges has expanded from approximately 6,800 in 2010-11 to 11,300 the following year with the addition of the local bridges.

Decisions involving bridge maintenance, retrofitting, strengthening, widening, and replacement rely heavily on complete and accurate load rating information. Additionally, load rating information is critical to our ability to safely route trucks across our state -- we currently average approximately 150,000 permits a year, all of which rely on load rating data.

Analysis of Problem

E. Outcomes and Accountability

Projected Outcomes – Plan of Corrective Action

Workload Measure	CY (2015-16)	BY (2016-17)	BY+1 (2017-18)	BY+2 (2018-19)	BY+3 (2019-20)	BY+4 (2020-21)	BY+5 (2021-22)
Bridges requiring new load ratings	7,427	6,179	4,931	3,683	2,435	1,186	12,700
Load rating completed	3,873	5,121	6,369	7,617	8,865	10,114	11,300*

*Total number of bridges to rate is approximately 24,000

F. Analysis of All Feasible Alternatives

Alternative 1: This alternative proposes 26 permanent positions and a total of \$4,640,000 (\$3,653,000 in Personal Services \$237,000 in Operating Expenses and a one-time augmentation of \$750,000 for Operating Expenses for software updates) in federal reimbursement authority.

The request includes 17 positions for load rating of state highway bridges, 9 positions for load rating of local agency bridges and a one-time request of \$750,000 for California's contribution to AASHTOWare software updates to complete federally mandated load rating of state highway bridges and satisfy the requirements of the plan of corrective action. By meeting these requirements and closing out the plan of corrective action, Caltrans will also be in compliance with the requirements set forth in the Code of Federal Regulations, the National Bridge Inspection Standards, and the California Bridges and Structures Strategic Direction.

Analysis of Alternative 1: Resources currently dedicated to this effort are limited-term and are due to expire in FY 2016-17. Our request for 26 permanent positions is the most cost effective alternative to ensuring completion of the federally mandated work and is made in recognition of this critical safety related work, our well-developed load rating team, and the effect this work will have on Caltrans as a whole through project completion and maintaining load ratings in the future.

Pros:

- Utilizes existing staff of Caltrans trained load rating engineers.
- Will bring the State into compliance with federal mandates.
- Reduced risk of bridge failures by providing a comprehensive analysis of all bridges.
- Improved bridge preservation through integration of bridge load rating findings with the bridge inspection, in order to identify, monitor, and/or repair weak elements of bridges.
- Integration of bridge rating data with bridge management systems to provide improved bridge deterioration models using a wider range of data.
- Enhanced ability to determine bridge damage estimates for highway cost allocation studies and for truck size and weight policy decisions.
- The use of bridge models by bridge designers in future projects that require modifications, rehabilitation, or analysis of the structure to reduce project development costs.

Cons:

- Requires new permanent resources.
- Plan of Corrective Action completion date of January 2017 would need to be renegotiated with the Federal Highway Administration and may result in federal penalties/sanctions if not approved.

Alternative 2: Contracting out - This alternative proposes a funding increase of \$5,950,000 in contract dollars and \$840,000 for 5 staff positions to administer contracting out oversight and provide quality assurance. The total annual cost is \$6,790,000 for 5-years.

Analysis of Problem

Analysis of Alternative 2: Many bridge records are not complete and/or legible. State engineers draw from every possible resource to gather information needed to load rate pre-1978 bridge inventory. Many of these resources cannot be easily made available to a consultant, thus creating potential conflicts. Additionally, consultants will not be provided the opportunity to work with the AASHTOWare software developers and our national partners to address software bugs and guidance material shortcomings. They will be forced to use the existing software, including all of the deficiencies, which could result in continued downgrades and inaccurate bridge ratings.

Pros:

- Contractor provides specialized expertise to complete the tasks.
- Consultant may be able to complete the current Plan of Corrective Action in a shorter time frame by utilizing a larger staff.

Cons:

- It will cost Caltrans more to contract out as consultant engineers earn substantially more than Caltrans engineers.
- Additional administrative costs for Caltrans to manage the contract.
- Inadequate/illegible bridge records will cause significant delays including increased staff research time.

Alternative 3: Reduce request to 17 ten year limited term positions and \$3,279,000 (\$2,374,000 in Personal Services and \$155,000 in Operating Expenses) and a one-time increase of \$750,000 to complete the federally mandated load rating of the State bridges in the FHWA Plan of Corrective Action.

Analysis of Alternative 3: This will not maximize current trained staff and would compromise our ability to meet federal mandates for load rating on all 24,000 bridges.

Pros:

- Future funding per year can be reduced.
- Allows for longer timeframe with respect to software development and improvements, field measurements by inspection staff, and improvements to the bridge management records for bridges built before 1978.

Cons:

- Reduction of fully trained load rating staff would be an inefficient use of resources.
- Plan of Corrective Action completion date would need to be extended proportional to the reduction in staff and may result in federal penalties/sanctions.
- Delay bridge load rating of remaining 12,700 bridges creating a potential extension or new Plan of Corrective Action.

G. Implementation Plan

July 1, 2016

H. Supplemental Information

None

I. Recommendation

Caltrans recommends approval of Alternative 1: 26 permanent positions and a total of \$4,640,000 (\$3,653,000 in Personal Services \$237,000 in Operating Expenses and a one-time augmentation of \$750,000 for Operating Expenses for software updates) in federal reimbursement authority.